

SEQUENCE LISTING



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<120> RECOMBINANT PLANT EXPRESSING NON-COMPETITIVELY BINDING Bt
INSECTICIDAL CRYSTAL PROTEINS

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<140> 10/809,953

<141> 2004-03-26

<150> 09/661.061

<151> 2000-09-13

<150> PCT/EP/00905

<151> 1990-05-30

<150> GB 89401499.2

<151> 1989-05-31

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<170> PatentIn version 3.3

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cct tac aat tgt tta agt aat cct aag gag ata ata tta ggc gag gaa		341
Pro Tyr Asn Cys Leu Ser Asn Pro Lys Glu Ile Ile Leu Gly Glu Glu		
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agg cta gaa aca ggg aat act gta gca gac att tca tta ggg ctt att		389
Arg Leu Glu Thr Gly Asn Thr Val Ala Asp Ile Ser Leu Gly Leu Ile		
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aat ttt cta tat tct aat ttt gta cca gga gga gga ttt ata gta ggt		437
Asn Phe Leu Tyr Ser Asn Phe Val Pro Gly Gly Phe Ile Val Gly		
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Leu Leu Glu Leu Ile Trp Gly Phe Ile Gly Pro Ser Gln Trp Asp Ile		
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Phe Leu Ala Gln Ile Glu Gln Leu Ile Ser Gln Arg Ile Glu Glu Phe		
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Ala Arg Asn Gln Ala Ile Ser Arg Leu Glu Gly Leu Ser Asn Leu Tyr		
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Lys Val Tyr Val Arg Ala Phe Ser Asp Trp Glu Lys Asp Pro Thr Asn		
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cct gct tta agg gaa atg cgt ata caa ttt aat gac atg aat agt		677
Pro Ala Leu Arg Glu Glu Met Arg Ile Gln Phe Asn Asp Met Asn Ser		
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Thr Ile Asn Asn Arg Tyr Ser Asp Leu Thr Ser Leu Ile His Val Tyr			
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Tyr Leu Asp Leu Pro Phe Ile Asn Gln Asn Leu Ser Pro Ala Ala Ser			
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Leu Val Asp Phe Leu Asn Ser Phe Thr Ile Tyr Thr Asp Ser Leu Ala			
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Arg Tyr Ala Tyr Trp Gly Gly His Leu Val Asn Ser Phe Arg Thr Gly			
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Thr Thr Asn Leu Ile Arg Ser Pro Leu Tyr Gly Arg Glu Gly Asn			
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Thr Glu Arg Pro Val Thr Ile Thr Ala Ser Pro Ser Val Pro Ile Phe			
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Arg Thr Leu Ser Tyr Ile Thr Gly Leu Asp Asn Ser Asn Pro Val Ala			
365	370	375	
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Gly Ile Glu Gly Val Glu Phe Gln Asn Thr Ile Ser Arg Ser Ile Tyr			
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Arg Lys Ser Gly Pro Ile Asp Ser Phe Ser Glu Leu Pro Pro Gln Asp			
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Ala Ser Val Ser Pro Ala Ile Gly Tyr Ser His Arg Leu Cys His Ala			
415	420	425	
aca ttt tta gaa cg ^g att agt gga cca aga ata gca ggc acc gta ttt			1589
Thr Phe Leu Glu Arg Ile Ser Gly Pro Arg Ile Ala Gly Thr Val Phe			
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Ser Trp Thr His Arg Ser Ala Ser Pro Thr Asn Glu Val Ser Pro Ser			
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Ala Ser Val Ile Lys Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu Thr			
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Arg Ala Gln Lys Val Val Asn Ala Leu Phe Thr Ser Thr Asn Gln Leu			
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765	770	775	
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Cys Gly Glu Pro Asn Arg Cys Ala Pro His Leu Glu Trp Asn Pro Asp			
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Leu His Cys Ser Cys Arg Asp Gly Glu Lys Cys Ala His His Ser His			
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cga cta ggg aat cta gag ttt ctc gaa gag aaa cca tta tga gaa	2837		
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Pro	Leu	Pro	Ala	Gly	Tyr	Val	Thr	Lys	Glu	Leu	Glu	Tyr	Phe	Pro	
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Ser Phe Thr Ile Tyr Thr Asp Ser Leu Ala Arg Tyr Ala Tyr Trp Gly
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Gly His Leu Val Asn Ser Phe Arg Thr Gly Thr Thr Asn Leu Ile
325 330 335

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340 345 350

Ile Thr Ala Ser Pro Ser Val Pro Ile Phe Arg Thr Leu Ser Tyr Ile
355 360 365

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370 375 380

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Ser Gly Pro Arg Ile Ala Gly Thr Val Phe Ser Trp Thr His Arg Ser
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Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr
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Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu His Cys Ser Cys Arg
785 790 795 800

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850 855 860

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Val Asn Ser Gln Tyr Asp Arg Leu Gln Ala Asp Thr Asn Ile Ala Met
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930 935 940

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Lys Gly His Val Glu Val Glu Glu Gln Asn Asn His Arg Ser Val Leu
980 985 990

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995 1000 1005

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Ile Asp Ile Ser Leu Ser Leu Val Gln Phe Met Val Ser Asn Phe Val
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cta att agg cat att gat gaa tat gct gat cac tgt gca aat acg tat Leu Ile Arg His Ile Asp Glu Tyr Ala Asp His Cys Ala Asn Thr Tyr 195 200 205	863
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aca tat aat cga tta cgg aga gac tta aca ttg act gta tta gat atc Thr Tyr Asn Arg Leu Arg Arg Asp Leu Thr Leu Thr Val Leu Asp Ile 225 230 235	959
gcc gct ttc ttt cca aac tat gac aat agg aga tat cca att cag cca Ala Ala Phe Phe Pro Asn Tyr Asp Asn Arg Arg Tyr Pro Ile Gln Pro 240 245 250 255	1007
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Glu Ser Ser Ala Ile Arg Asn Pro His Leu Phe Asp Ile Leu Asn Asn			
290	295	300	
ctt aca atc ttt acg gat tgg ttt agt gtt gga cgc aat ttt tat tgg		1199	
Leu Thr Ile Phe Thr Asp Trp Phe Ser Val Gly Arg Asn Phe Tyr Trp			
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gga gga cat cga gta ata tct agc ctt ata gga ggt ggt aac ata aca		1247	
Gly Gly His Arg Val Ile Ser Ser Leu Ile Gly Gly Gly Asn Ile Thr			
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tct cct ata tat gga aga gag gcg aac cag gag cct cca aga tcc ttt		1295	
Ser Pro Ile Tyr Gly Arg Glu Ala Asn Gln Glu Pro Pro Arg Ser Phe			
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Thr Phe Asn Gly Pro Val Phe Arg Thr Leu Ser Asn Pro Thr Leu Arg			
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tta tta cag caa cct tgg cca gcg cca cca ttt aat tta cgt ggt gtt		1391	
Leu Leu Gln Gln Pro Trp Pro Ala Pro Pro Phe Asn Leu Arg Gly Val			
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Glu Gly Val Glu Phe Ser Thr Pro Thr Asn Ser Phe Thr Tyr Arg Gly			
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Arg Gly Thr Val Asp Ser Leu Thr Glu Leu Pro Pro Glu Asp Asn Ser			
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Val Gln Arg Ser Gly Thr Pro Phe Leu Thr Thr Gly Val Val Phe Ser			
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Trp Thr His Arg Ser Ala Thr Leu Thr Asn Thr Ile Asp Pro Glu Arg			
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att aat caa ata cct tta gtg aaa gga ttt aga gtt tgg ggg ggc acc		1679	
Ile Asn Gln Ile Pro Leu Val Lys Gly Phe Arg Val Trp Gly Gly Thr			
465	470	475	
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Ser Val Ile Thr Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu Arg Arg			
480	485	490	495
aat acc ttt ggt gat ttt gta tct cta caa gtc aat att aat tca cca		1775	
Asn Thr Phe Gly Asp Phe Val Ser Leu Gln Val Asn Ile Asn Ser Pro			
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Ile Thr Gln Arg Tyr Arg Leu Arg Phe Arg Tyr Ala Ser Ser Arg Asp			
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aac tta aca tct aga aca ttt aga tat acc gat ttt agt aat cct ttt Asn Leu Thr Ser Arg Thr Phe Arg Tyr Thr Asp Phe Ser Asn Pro Phe 560 565 570 575	1967
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cca acg tat tta tat cag aaa ata gat gag tcg aaa tta aaa gct tat Pro Thr Tyr Leu Tyr Gln Lys Ile Asp Glu Ser Lys Leu Lys Ala Tyr 740 745 750	2495
acc cgt tat gaa tta aga ggg tat atc gaa gat agt caa gac tta gaa Thr Arg Tyr Glu Leu Arg Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu 755 760 765	2543

atc tat ttg atc cgt tac aat gca aaa cac gaa ata gta aat gtg cca Ile Tyr Leu Ile Arg Tyr Asn Ala Lys His Glu Ile Val Asn Val Pro 770 775 780	2591
ggc acg ggt tcc tta tgg ccg ctt tca gcc caa agt cca atc gga aag Gly Thr Gly Ser Leu Trp Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys 785 790 795	2639
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cat ttc acc ttg gat att gat gtt gga tgt aca gac tta aat gag gac His Phe Thr Leu Asp Ile Asp Val Gly Cys Thr Asp Leu Asn Glu Asp 835 840 845	2783
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gca cta gct cgt gtg aaa aga gcg gag aag aag tgg aga gac aaa cga Ala Leu Ala Arg Val Lys Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg 880 885 890 895	2927
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Ser	Gln	Glu	Val	Arg	Val	Cys	Pro	Gly	Arg	Gly	Tyr	Ile	Leu	Arg	
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gtc	aca	gca	tat	aaa	gag	gga	tat	gga	gag	ggc	tgc	gta	acg	atc	3398
Val	Thr	Ala	Tyr	Lys	Glu	Gly	Tyr	Gly	Glu	Gly	Cys	Val	Thr	Ile	
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His	Glu	Ile	Glu	Asp	Asn	Thr	Asp	Glu	Leu	Lys	Phe	Ser	Asn	Cys	
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Val	Glu	Glu	Glu	Val	Tyr	Pro	Asn	Asn	Thr	Val	Thr	Cys	Asn	Asn	
1070							1075					1080			
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Tyr	Thr	Gly	Thr	Gln	Glu	Glu	Tyr	Glu	Gly	Thr	Tyr	Thr	Ser	Arg	
1085							1090					1095			
aat	caa	gga	tat	gac	gaa	gcc	tat	ggt	aat	aac	cct	tcc	gta	cca	3578
Asn	Gln	Gly	Tyr	Asp	Glu	Ala	Tyr	Gly	Asn	Asn	Pro	Ser	Val	Pro	
1100							1105					1110			
gct	gat	tac	gct	tca	gtc	tat	gaa	gaa	aaa	tcg	tat	aca	gat	gga	3623
Ala	Asp	Tyr	Ala	Ser	Val	Tyr	Glu	Glu	Lys	Ser	Tyr	Thr	Asp	Gly	
1115							1120					1125			
cga	aga	gag	aat	cct	tgt	gaa	tct	aac	aga	ggc	tat	ggg	gat	tac	3668
Arg	Arg	Glu	Asn	Pro	Cys	Glu	Ser	Asn	Arg	Gly	Tyr	Gly	Asp	Tyr	
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aca	cca	cta	ccg	gct	ggt	tat	gta	aca	aag	gat	tta	gag	tac	ttc	3713
Thr	Pro	Leu	Pro	Ala	Gly	Tyr	Val	Thr	Lys	Asp	Leu	Glu	Tyr	Phe	
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Pro	Glu	Thr	Asp	Lys	Val	Trp	Ile	Glu	Ile	Gly	Glu	Thr	Glu	Gly	
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Thr	Phe	Ile	Val	Asp	Ser	Val	Glu	Leu	Leu	Leu	Met	Glu	Glu		
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Asp Ile Ser Leu Ser Leu Val Gln Phe Met Val Ser Asn Phe Val Pro
35 40 45

Gly Gly Gly Phe Leu Val Gly Leu Ile Asp Phe Val Trp Gly Ile Val
50 55 60

Gly Pro Ser Gln Trp Asp Ala Phe Leu Val Gln Ile Glu Gln Leu Ile
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Asn Glu Arg Ile Ala Glu Phe Ala Arg Asn Ala Ala Ile Ala Asn Leu
85 90 95

Glu Gly Leu Glu Asn Asn Leu Asn Ile Tyr Val Glu Ala Phe Lys Glu
100 105 110

Trp Glu Glu Asp Pro Asn Asn Pro Glu Thr Arg Thr Arg Val Ile Asp
115 120 125

Arg Phe Arg Ile Leu Asp Gly Leu Leu Glu Arg Asp Ile Pro Ser Phe
130 135 140

Arg Ile Ser Gly Phe Glu Val Pro Leu Leu Ser Val Tyr Ala Gln Ala
145 150 155 160

Ala Asn Leu His Leu Ala Ile Leu Arg Asp Ser Val Ile Phe Gly Glu
165 170 175

Arg Trp Gly Leu Thr Thr Ile Asn Val Asn Glu Asn Tyr Asn Arg Leu
180 185 190

Ile Arg His Ile Asp Glu Tyr Ala Asp His Cys Ala Asn Thr Tyr Asn
195 200 205

Arg Gly Leu Asn Asn Leu Pro Lys Ser Thr Tyr Gln Asp Trp Ile Thr
210 215 220

Tyr Asn Arg Leu Arg Arg Asp Leu Thr Leu Thr Val Leu Asp Ile Ala
225 230 235 240

Ala Phe Phe Pro Asn Tyr Asp Asn Arg Arg Tyr Pro Ile Gln Pro Val
245 250 255

Gly Gln Leu Thr Arg Glu Val Tyr Thr Asp Pro Leu Ile Asn Phe Asn
260 265 270

Pro Gln Leu Gln Ser Val Ala Gln Leu Pro Thr Phe Asn Val Met Glu
275 280 285

Ser Ser Ala Ile Arg Asn Pro His Leu Phe Asp Ile Leu Asn Asn Leu
290 295 300

Thr Ile Phe Thr Asp Trp Phe Ser Val Gly Arg Asn Phe Tyr Trp Gly
305 310 315 320

Gly His Arg Val Ile Ser Ser Leu Ile Gly Gly Gly Asn Ile Thr Ser
325 330 335

Pro Ile Tyr Gly Arg Glu Ala Asn Gln Glu Pro Pro Arg Ser Phe Thr
340 345 350

Phe Asn Gly Pro Val Phe Arg Thr Leu Ser Asn Pro Thr Leu Arg Leu
355 360 365

Leu Gln Gln Pro Trp Pro Ala Pro Pro Phe Asn Leu Arg Gly Val Glu
370 375 380

Gly Val Glu Phe Ser Thr Pro Thr Asn Ser Phe Thr Tyr Arg Gly Arg
385 390 395 400

Gly Thr Val Asp Ser Leu Thr Glu Leu Pro Pro Glu Asp Asn Ser Val
405 410 415

Pro Pro Arg Glu Gly Tyr Ser His Arg Leu Cys His Ala Thr Phe Val
420 425 430

Gln Arg Ser Gly Thr Pro Phe Leu Thr Thr Gly Val Val Phe Ser Trp
435 440 445

Thr His Arg Ser Ala Thr Leu Thr Asn Thr Ile Asp Pro Glu Arg Ile
450 455 460

Asn Gln Ile Pro Leu Val Lys Gly Phe Arg Val Trp Gly Gly Thr Ser
465 470 475 480

Val Ile Thr Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu Arg Arg Asn
485 490 495

Thr Phe Gly Asp Phe Val Ser Leu Gln Val Asn Ile Asn Ser Pro Ile
500 505 510

Thr Gln Arg Tyr Arg Leu Arg Phe Arg Tyr Ala Ser Ser Arg Asp Ala
515 520 525

Arg Val Ile Val Leu Thr Gly Ala Ala Ser Thr Gly Val Gly Gly Gln
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Val Ser Val Asn Met Pro Leu Gln Lys Thr Met Glu Ile Gly Glu Asn
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Leu Thr Ser Arg Thr Phe Arg Tyr Thr Asp Phe Ser Asn Pro Phe Ser
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Phe Arg Ala Asn Pro Asp Ile Ile Gly Ile Ser Glu Gln Pro Leu Phe
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Gly Ala Gly Ser Ile Ser Ser Gly Glu Leu Tyr Ile Asp Lys Ile Glu
595 600 605

Ile Ile Leu Ala Asp Ala Thr Phe Glu Ala Glu Ser Asp Leu Glu Arg
610 615 620

Ala Gln Lys Ala Val Asn Ala Leu Phe Thr Ser Ser Asn Gln Ile Gly
625 630 635 640

Leu Lys Thr Asp Val Thr Asp Tyr His Ile Asp Gln Val Ser Asn Leu
645 650 655

Val Asp Cys Leu Ser Asp Glu Phe Cys Leu Asp Glu Lys Arg Glu Leu
660 665 670

Ser Glu Lys Val Lys His Ala Lys Arg Leu Ser Asp Glu Arg Asn Leu
675 680 685

Leu Gln Asp Pro Asn Phe Arg Gly Ile Asn Arg Gln Pro Asp Arg Gly
690 695 700

Trp Arg Gly Ser Thr Asp Ile Thr Ile Gln Gly Gly Asp Asp Val Phe
705 710 715 720

Lys Glu Asn Tyr Val Thr Leu Pro Gly Thr Val Asp Glu Cys Tyr Pro
725 730 735

Thr Tyr Leu Tyr Gln Lys Ile Asp Glu Ser Lys Leu Lys Ala Tyr Thr
740 745 750

Arg Tyr Glu Leu Arg Gly Tyr Ile Glu Asp Ser Gln Asp Leu Glu Ile
755 760 765

Tyr Leu Ile Arg Tyr Asn Ala Lys His Glu Ile Val Asn Val Pro Gly
770 775 780

Thr Gly Ser Leu Trp Pro Leu Ser Ala Gln Ser Pro Ile Gly Lys Cys
785 790 795 800

Gly Glu Pro Asn Arg Cys Ala Pro His Leu Glu Trp Asn Pro Asp Leu
805 810 815

Asp Cys Ser Cys Arg Asp Gly Glu Lys Cys Ala His His Ser His His
820 825 830

Phe Thr Leu Asp Ile Asp Val Gly Cys Thr Asp Leu Asn Glu Asp Leu
835 840 845

Gly Val Trp Val Ile Phe Lys Ile Lys Thr Gln Asp Gly His Ala Arg
850 855 860

Leu Gly Asn Leu Glu Phe Leu Glu Glu Lys Pro Leu Leu Gly Glu Ala
865 870 875 880

Leu Ala Arg Val Lys Arg Ala Glu Lys Lys Trp Arg Asp Lys Arg Glu
885 890 895

Lys Leu Gln Leu Glu Thr Asn Ile Val Tyr Lys Glu Ala Lys Glu Ser
900 905 910

Val Asp Ala Leu Phe Val Asn Ser Gln Tyr Asp Arg Leu Gln Val Asp
915 920 925

Thr Asn Ile Ala Met Ile His Ala Ala Asp Lys Arg Val His Arg Ile
930 935 940

Arg Glu Ala Tyr Leu Pro Glu Leu Ser Val Ile Pro Gly Val Asn Ala
945 950 955 960

Ala Ile Phe Glu Glu Leu Glu Gly Arg Ile Phe Thr Ala Tyr Ser Leu
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Tyr Asp Ala Arg Asn Val Ile Lys Asn Gly Asp Phe Asn Asn Gly Leu
980 985 990

Leu Cys Trp Asn Val Lys Gly His Val Asp Val Glu Glu Gln Asn Asn
995 1000 1005

His Arg Ser Val Leu Val Ile Pro Glu Trp Glu Ala Glu Val Ser
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Gln Glu Val Arg Val Cys Pro Gly Arg Gly Tyr Ile Leu Arg Val
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Glu Ile Glu Asp Asn Thr Asp Glu Leu Lys Phe Ser Asn Cys Val
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Gln Gly Tyr Asp Glu Ala Tyr Gly Asn Asn Pro Ser Val Pro Ala
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1145 1150 1155

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tca aca gtc caa acg ggt att aac ata gct ggt aga ata cta ggc gta Ser Thr Val Gln Thr Gly Ile Asn Ile Ala Gly Arg Ile Leu Gly Val 50 55 60	192
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gtt ggt gaa tta tgg ccc cgc ggc aga gat cag tgg gaa att ttc cta Val Gly Glu Leu Trp Pro Arg Gly Arg Asp Gln Trp Glu Ile Phe Leu 85 90 95	288
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aat acg gct ctt gct cga tta caa ggt tta gga gat tcc ttc aga gcc Asn Thr Ala Leu Ala Arg Leu Gln Gly Leu Gly Asp Ser Phe Arg Ala 115 120 125	384
tat caa cag tca ctt gaa gat tgg cta gaa aac cgt gat gat gca aga Tyr Gln Gln Ser Leu Glu Asp Trp Leu Glu Asn Arg Asp Asp Ala Arg 130 135 140	432
acg aga agt gtt ctt cat acc caa tat ata gct tta gaa ctt gat ttt Thr Arg Ser Val Leu His Thr Gln Tyr Ile Ala Leu Glu Leu Asp Phe 145 150 155 160	480
ctt aat gcg atg ccg ctt ttc gca att aga aac caa gaa gtt cca tta Leu Asn Ala Met Pro Leu Phe Ala Ile Arg Asn Gln Glu Val Pro Leu 165 170 175	528
ttg atg gta tat gct caa gct gca aat tta cac cta tta ttg aga Leu Met Val Tyr Ala Gln Ala Ala Asn Leu His Leu Leu Leu Arg 180 185 190	576
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Asp Ala Ser Leu Phe Gly Ser Glu Phe Gly Leu Thr Ser Gln Glu Ile
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caa cgc tat tat gag cgc caa gtg gaa cga acg aga gat tat tcc gac 672
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 210 215 220

tat tgc gta gaa tgg tat aat aca ggt cta aat agc ttg aga ggg aca 720
 Tyr Cys Val Glu Trp Tyr Asn Thr Gly Leu Asn Ser Leu Arg Gly Thr
 225 230 235 240

aat gcc gca agt tgg gta cgg tat aat caa ttc cgt aga gat cta acg 768
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 260 265 270

act tat cca ata aat acg agt gct cag tta aca aga gaa gtt tat aca 864
 Thr Tyr Pro Ile Asn Thr Ser Ala Gln Leu Thr Arg Glu Val Tyr Thr
 275 280 285

gac gca att gga gca aca ggg gta aat atg gca agt atg aat tgg tat 912
 Asp Ala Ile Gly Ala Thr Gly Val Asn Met Ala Ser Met Asn Trp Tyr
 290 295 300

aat aat aat gca cct tcg ttc tct gcc ata gag gct gcg gct atc cga 960
 Asn Asn Asn Ala Pro Ser Phe Ser Ala Ile Glu Ala Ala Ala Ile Arg
 305 310 315 320

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 Ser Pro His Leu Leu Asp Phe Leu Glu Gln Leu Thr Ile Phe Ser Ala
 325 330 335

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 Ser Ser Arg Trp Ser Asn Thr Arg His Met Thr Tyr Trp Arg Gly His
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acg att caa tct cgg cca ata gga ggc gga tta aat acc tca acg cat 1104
 Thr Ile Gln Ser Arg Pro Ile Gly Gly Leu Asn Thr Ser Thr His
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ggg gct acc aat act tct att aat cct gta aca tta cgg ttc gca tct 1152
 Gly Ala Thr Asn Thr Ser Ile Asn Pro Val Thr Leu Arg Phe Ala Ser
 370 375 380

cga gac gtt tat agg act gaa tca tat gca gga gtg ctt cta tgg gga 1200
 Arg Asp Val Tyr Arg Thr Glu Ser Tyr Ala Gly Val Leu Leu Trp Gly
 385 390 395 400

att tac ctt gaa cct att cat ggt gtc cct act gtt agg ttt aat ttt 1248
 Ile Tyr Leu Glu Pro Ile His Gly Val Pro Thr Val Arg Phe Asn Phe
 405 410 415

acg aac cct cag aat att tct gat aga ggt acc gct aac tat agt caa 1296
 Thr Asn Pro Gln Asn Ile Ser Asp Arg Gly Thr Ala Asn Tyr Ser Gln
 420 425 430

cct tat gag tca cct ggg ctt caa tta aaa gat tca gaa act gaa tta 1344

Pro	Tyr	Glu	Ser	Pro	Gly	Leu	Gln	Leu	Lys	Asp	Ser	Glu	Thr	Glu	Leu	
435																445
cca	cca	gaa	aca	aca	gaa	cga	cca	aat	tat	gaa	tct	tac	agt	cac	agg	1392
Pro	Pro	Glu	Thr	Thr	Glu	Arg	Pro	Asn	Tyr	Glu	Ser	Tyr	Ser	His	Arg	
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tta	tct	cat	ata	ggt	ata	att	tta	caa	tcc	agg	gtg	aat	gta	ccg	gta	1440
Leu	Ser	His	Ile	Gly	Ile	Ile	Leu	Gln	Ser	Arg	Val	Asn	Val	Pro	Val	
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tat	tct	tgg	acg	cat	cgt	agt	gca	gat	cgt	acg	aat	acg	att	gga	cca	1488
Tyr	Ser	Trp	Thr	His	Arg	Ser	Ala	Asp	Arg	Thr	Asn	Thr	Ile	Gly	Pro	
485																495
aat	aga	atc	acc	caa	atc	cca	atg	gta	aaa	gca	tcc	gaa	ctt	cct	caa	1536
Asn	Arg	Ile	Thr	Gln	Ile	Pro	Met	Val	Lys	Ala	Ser	Glu	Leu	Pro	Gln	
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ggt	acc	act	gtt	gtt	aga	gga	cca	gga	ttt	act	ggt	ggg	gat	att	ctt	1584
Gly	Thr	Thr	Val	Val	Arg	Gly	Pro	Gly	Phe	Thr	Gly	Gly	Asp	Ile	Leu	
515																525
cga	aga	acg	aat	act	ggt	gga	ttt	gga	ccg	ata	aga	gta	act	gtt	aac	1632
Arg	Arg	Thr	Asn	Thr	Gly	Gly	Phe	Gly	Pro	Ile	Arg	Val	Thr	Val	Asn	
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gga	cca	tta	aca	caa	aga	tat	cgt	ata	gga	ttc	cgc	tat	gct	tca	act	1680
Gly	Pro	Leu	Thr	Gln	Arg	Tyr	Arg	Ile	Gly	Phe	Arg	Tyr	Ala	Ser	Thr	
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gta	gat	ttt	gat	ttc	ttt	gta	tca	cgt	gga	ggt	act	act	act	gta	aat	1728
Val	Asp	Phe	Asp	Phe	Phe	Val	Ser	Arg	Gly	Gly	Thr	Thr	Val	Asn	Asn	
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ttt	aga	ttc	cta	cgt	aca	atg	aac	agt	gga	gac	gaa	cta	aaa	tac	gga	1776
Phe	Arg	Phe	Leu	Arg	Thr	Met	Asn	Ser	Gly	Asp	Glu	Leu	Lys	Tyr	Gly	
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aat	ttt	gtg	aga	cgt	gct	ttt	act	aca	cct	ttt	act	ttt	aca	caa	att	1824
Asn	Phe	Val	Arg	Arg	Ala	Phe	Thr	Thr	Pro	Phe	Thr	Phe	Thr	Gln	Ile	
595																605
caa	gat	ata	att	cga	acg	tct	att	caa	ggc	ctt	agt	gga	aat	ggg	gaa	1872
Gln	Asp	Ile	Ile	Arg	Thr	Ser	Ile	Gln	Gly	Leu	Ser	Gly	Asn	Gly	Glu	
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gtg	tat	ata	gat	aaa	att	gaa	att	att	cca	gtt	act	gca	acc	ttc	gaa	1920
Val	Tyr	Ile	Asp	Lys	Ile	Glu	Ile	Ile	Pro	Val	Thr	Ala	Thr	Phe	Glu	
625																640
gca	gaa	tat	gat	tta	gaa	aga	gcg	caa	gag	gcg	gtg	aat	gct	ctg	ttt	1968
Ala	Glu	Tyr	Asp	Leu	Glu	Arg	Ala	Gln	Glu	Ala	Val	Asn	Ala	Leu	Phe	
645																655
act	aat	acg	aat	cca	aga	aga	ttg	aaa	aca	gat	gtg	aca	gat	tat	cat	2016
Thr	Asn	Thr	Asn	Pro	Arg	Arg	Leu	Lys	Thr	Asp	Val	Thr	Asp	Tyr	His	
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att	gat	caa	gta	tcc	aat	tta	gtg	gcg	tgt	tta	tcg	gat	gaa	ttc	tgc	2064

Ile Asp Gln Val Ser Asn Leu Val Ala Cys Leu Ser Asp Glu Phe Cys			
675	680	685	
ttg gat gaa aag aga gaa tta ctt gag aaa gtg aaa tat gcg aaa cga			2112
Leu Asp Glu Lys Arg Glu Leu Leu Glu Lys Val Lys Tyr Ala Lys Arg			
690	695	700	
ctc agt gat gaa aga aac tta ctc caa gat cca aac ttc aca tcc atc			2160
Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Thr Ser Ile			
705	710	715	720
aat aag caa cca gac ttc ata tct act aat gag caa tcg aat ttc aca			2208
Asn Lys Gln Pro Asp Phe Ile Ser Thr Asn Glu Gln Ser Asn Phe Thr			
725	730	735	
tct atc cat gaa caa tct gaa cat gga tgg tgg gga agt gag aac att			2256
Ser Ile His Glu Gln Ser Glu His Gly Trp Trp Gly Ser Glu Asn Ile			
740	745	750	
acc atc cag gaa gga aat gac gta ttt aaa gag aat tac gtc aca cta			2304
Thr Ile Gln Glu Gly Asn Asp Val Phe Lys Glu Asn Tyr Val Thr Leu			
755	760	765	
ccg ggt act ttt aat gag tgt tat ccg acg tat tta tat caa aaa ata			2352
Pro Gly Thr Phe Asn Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile			
770	775	780	
ggg gag tcg gaa tta aaa gct tat act cgc tac caa tta aga ggt tat			2400
Gly Glu Ser Glu Leu Lys Ala Tyr Thr Arg Tyr Gln Leu Arg Gly Tyr			
785	790	795	800
att gaa gat agt caa gat tta gag ata tat ttg att cgt tat aat gcg			2448
Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala			
805	810	815	
aaa cat gaa aca ttg gat gtt cca ggt acc gag tcc cta tgg ccg ctt			2496
Lys His Glu Thr Leu Asp Val Pro Gly Thr Glu Ser Leu Trp Pro Leu			
820	825	830	
tca gtt gaa agc cca atc gga agg tgc gga gaa ccg aat cga tgc gca			2544
Ser Val Glu Ser Pro Ile Gly Arg Cys Gly Glu Pro Asn Arg Cys Ala			
835	840	845	
cca cat ttt gaa tgg aat cct gat cta gat tgt tcc tgc aga gat gga			2592
Pro His Phe Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly			
850	855	860	
gaa aaa tgt gcg cat cat tcc cat cat ttc tct ttg gat att gat gtt			2640
Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile Asp Val			
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gga tgc aca gac ttg cat gag aat cta ggc gtg tgg gtg gta ttc aag			2688
Gly Cys Thr Asp Leu His Glu Asn Leu Gly Val Trp Val Val Phe Lys			
885	890	895	
att aag acg cag gaa ggt cat gca aga cta ggg aat ctg gaa ttt att			2736
Ile Lys Thr Gln Glu Gly His Ala Arg Leu Gly Asn Leu Glu Phe Ile			
900	905	910	
gaa gag aaa cca tta tta gga gaa gca ctg tct cgt gtg aag agg gca			2784

Glu	Glu	Lys	Pro	Leu	Leu	Gly	Glu	Ala	Leu	Ser	Arg	Val	Lys	Arg	Ala	
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gag aaa aaa tgg aga gac aaa cgt gaa aaa cta caa ttg gaa aca aca aaa															2832	
Glu	Lys	Lys	Trp	Arg	Asp	Lys	Arg	Glu	Lys	Leu	Gln	Leu	Glu	Thr	Lys	
930							935						940			
cga gta tat aca gag gca aaa gaa gct gtg gat gct tta ttc gta gat															2880	
Arg	Val	Tyr	Thr	Glu	Ala	Lys	Glu	Ala	Val	Asp	Ala	Leu	Phe	Val	Asp	
945							950						955			960
tct caa tat gat aga tta caa gcg gat aca aac atc ggc atg att cat															2928	
Ser	Gln	Tyr	Asp	Arg	Leu	Gln	Ala	Asp	Thr	Asn	Ile	Gly	Met	Ile	His	
965							970						975			
gcg gca gat aaa ctt gtt cat cga att cga gag gcg tat ctt tca gaa															2976	
Ala	Ala	Asp	Lys	Leu	Val	His	Arg	Ile	Arg	Glu	Ala	Tyr	Leu	Ser	Glu	
980							985						990			
tta cct gtt atc cca ggt gta aat gcg gaa att ttt gaa gaa tta gaa															3024	
Leu	Pro	Val	Ile	Pro	Gly	Val	Asn	Ala	Glu	Ile	Phe	Glu	Glu	Leu	Glu	
995							1000						1005			
ggc cac att atc act gca atc tcc tta tac gat gcg aga aat gtc															3069	
Gly	His	Ile	Ile	Thr	Ala	Ile	Ser	Leu	Tyr	Asp	Ala	Arg	Asn	Val		
1010							1015						1020			
gtt aaa aat ggt gat ttt aat aat gga tta aca tgt tgg aat gta															3114	
Val	Lys	Asn	Gly	Asp	Phe	Asn	Asn	Gly	Leu	Thr	Cys	Trp	Asn	Val		
1025							1030						1035			
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Lys	Gly	His	Val	Asp	Val	Gln	Gln	Ser	His	His	Arg	Ser	Asp	Leu		
1040							1045						1050			
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Val	Ile	Pro	Glu	Trp	Glu	Ala	Glu	Val	Ser	Gln	Ala	Val	Arg	Val		
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Cys	Pro	Gly	Cys	Gly	Tyr	Ile	Leu	Arg	Val	Thr	Ala	Tyr	Lys	Glu		
1070							1075						1080			
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Gly	Tyr	Gly	Glu	Gly	Cys	Val	Thr	Ile	His	Glu	Ile	Glu	Asn	Asn		
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aca gac gaa cta aaa ttt aaa aac cgt gaa gaa gag gaa gtg tat															3339	
Thr	Asp	Glu	Leu	Lys	Phe	Lys	Asn	Arg	Glu	Glu	Glu	Val	Tyr			
1100							1105						1110			
cca acg gat aca gga acg tgt aat gat tat act gca cac caa ggt															3384	
Pro	Thr	Asp	Thr	Gly	Thr	Cys	Asn	Asp	Tyr	Thr	Ala	His	Gln	Gly		
1115							1120						1125			
aca gct gga tgc gca gat gca tgt aat tcc cgt aat gct gga tat															3429	
Thr	Ala	Gly	Cys	Ala	Asp	Ala	Cys	Asn	Ser	Arg	Asn	Ala	Gly	Tyr		
1130							1135						1140			
gag gat gca tat gaa gtt gat act aca gca tct gtt aat tac aaa															3474	

Glu	Asp	Ala	Tyr	Glu	Val	Asp	Thr	Thr	Ala	Ser	Val	Asn	Tyr	Lys	
1145				1150					1155						
ccg	act	tat	gaa	gaa	gaa	acg	tat	aca	gat	gta	aga	aga	gat	aat	3519
Pro	Thr	Tyr	Glu	Glu	Glu	Thr	Tyr	Thr	Asp	Val	Arg	Arg	Asp	Asn	
1160		1165							1170						
cat	tgt	gaa	tat	gac	aga	ggg	tat	gtc	aat	tat	cca	cca	gta	cca	3564
His	Cys	Glu	Tyr	Asp	Arg	Gly	Tyr	Val	Asn	Tyr	Pro	Pro	Val	Pro	
1175				1180					1185						
gct	ggt	tat	gtg	aca	aaa	gaa	tta	gaa	tac	ttc	cca	gaa	aca	gat	3609
Ala	Gly	Tyr	Val	Thr	Lys	Glu	Leu	Glu	Tyr	Phe	Pro	Glu	Thr	Asp	
1190				1195					1200						
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Thr	Val	Trp	Ile	Glu	Ile	Gly	Glu	Thr	Glu	Gly	Lys	Phe	Ile	Val	
1205				1210					1215						
gat	agc	gtg	gaa	tta	ctc	ctc	atg	gaa	gaa	tag					3687
Asp	Ser	Val	Glu	Leu	Leu	Leu	Met	Glu	Glu						
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<400> 10

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Asn His Ser Ala Gln Met Asp Leu Leu Pro Asp Ala Arg Ile Glu Asp
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Ser Leu Cys Ile Ala Glu Gly Asn Asn Ile Asp Pro Phe Val Ser Ala
35 40 45

Ser Thr Val Gln Thr Gly Ile Asn Ile Ala Gly Arg Ile Leu Gly Val
50 55 60

Leu Gly Val Pro Phe Ala Gly Gln Leu Ala Ser Phe Tyr Ser Phe Leu
65 70 75 80

Val Gly Glu Leu Trp Pro Arg Gly Arg Asp Gln Trp Glu Ile Phe Leu
85 90 95

Glu His Val Glu Gln Leu Ile Asn Gln Gln Ile Thr Glu Asn Ala Arg
100 105 110

Asn Thr Ala Leu Ala Arg Leu Gln Gly Leu Gly Asp Ser Phe Arg Ala

115 120 125

Tyr Gln Gln Ser Leu Glu Asp Trp Leu Glu Asn Arg Asp Asp Ala Arg
130 135 140

Thr Arg Ser Val Leu His Thr Gln Tyr Ile Ala Leu Glu Leu Asp Phe
145 150 155 160

Leu Asn Ala Met Pro Leu Phe Ala Ile Arg Asn Gln Glu Val Pro Leu
165 170 175

Leu Met Val Tyr Ala Gln Ala Ala Asn Leu His Leu Leu Leu Leu Arg
180 185 190

Asp Ala Ser Leu Phe Gly Ser Glu Phe Gly Leu Thr Ser Gln Glu Ile
195 200 205

Gln Arg Tyr Tyr Glu Arg Gln Val Glu Arg Thr Arg Asp Tyr Ser Asp
210 215 220

Tyr Cys Val Glu Trp Tyr Asn Thr Gly Leu Asn Ser Leu Arg Gly Thr
225 230 235 240

Asn Ala Ala Ser Trp Val Arg Tyr Asn Gln Phe Arg Arg Asp Leu Thr
245 250 255

Leu Gly Val Leu Asp Leu Val Ala Leu Phe Pro Ser Tyr Asp Thr Arg
260 265 270

Thr Tyr Pro Ile Asn Thr Ser Ala Gln Leu Thr Arg Glu Val Tyr Thr
275 280 285

Asp Ala Ile Gly Ala Thr Gly Val Asn Met Ala Ser Met Asn Trp Tyr
290 295 300

Asn Asn Asn Ala Pro Ser Phe Ser Ala Ile Glu Ala Ala Ala Ile Arg
305 310 315 320

Ser Pro His Leu Leu Asp Phe Leu Glu Gln Leu Thr Ile Phe Ser Ala
325 330 335

Ser Ser Arg Trp Ser Asn Thr Arg His Met Thr Tyr Trp Arg Gly His
340 345 350

Thr Ile Gln Ser Arg Pro Ile Gly Gly Leu Asn Thr Ser Thr His

355

360

365

Gly Ala Thr Asn Thr Ser Ile Asn Pro Val Thr Leu Arg Phe Ala Ser
370 375 380

Arg Asp Val Tyr Arg Thr Glu Ser Tyr Ala Gly Val Leu Leu Trp Gly
385 390 395 400

Ile Tyr Leu Glu Pro Ile His Gly Val Pro Thr Val Arg Phe Asn Phe
405 410 415

Thr Asn Pro Gln Asn Ile Ser Asp Arg Gly Thr Ala Asn Tyr Ser Gln
420 425 430

Pro Tyr Glu Ser Pro Gly Leu Gln Leu Lys Asp Ser Glu Thr Glu Leu
435 440 445

Pro Pro Glu Thr Thr Glu Arg Pro Asn Tyr Glu Ser Tyr Ser His Arg
450 455 460

Leu Ser His Ile Gly Ile Ile Leu Gln Ser Arg Val Asn Val Pro Val
465 470 475 480

Tyr Ser Trp Thr His Arg Ser Ala Asp Arg Thr Asn Thr Ile Gly Pro
485 490 495

Asn Arg Ile Thr Gln Ile Pro Met Val Lys Ala Ser Glu Leu Pro Gln
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Gly Thr Thr Val Val Arg Gly Pro Gly Phe Thr Gly Gly Asp Ile Leu
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Arg Arg Thr Asn Thr Gly Gly Phe Gly Pro Ile Arg Val Thr Val Asn
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Gly Pro Leu Thr Gln Arg Tyr Arg Ile Gly Phe Arg Tyr Ala Ser Thr
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Val Asp Phe Asp Phe Phe Val Ser Arg Gly Gly Thr Thr Val Asn Asn
565 570 575

Phe Arg Phe Leu Arg Thr Met Asn Ser Gly Asp Glu Leu Lys Tyr Gly
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Asn Phe Val Arg Arg Ala Phe Thr Thr Pro Phe Thr Phe Thr Gln Ile

595 600 605

Gln Asp Ile Ile Arg Thr Ser Ile Gln Gly Leu Ser Gly Asn Gly Glu
610 615 620

Val Tyr Ile Asp Lys Ile Glu Ile Ile Pro Val Thr Ala Thr Phe Glu
625 630 635 640

Ala Glu Tyr Asp Leu Glu Arg Ala Gln Glu Ala Val Asn Ala Leu Phe
645 650 655

Thr Asn Thr Asn Pro Arg Arg Leu Lys Thr Asp Val Thr Asp Tyr His
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Ile Asp Gln Val Ser Asn Leu Val Ala Cys Leu Ser Asp Glu Phe Cys
675 680 685

Leu Asp Glu Lys Arg Glu Leu Leu Glu Lys Val Lys Tyr Ala Lys Arg
690 695 700

Leu Ser Asp Glu Arg Asn Leu Leu Gln Asp Pro Asn Phe Thr Ser Ile
705 710 715 720

Asn Lys Gln Pro Asp Phe Ile Ser Thr Asn Glu Gln Ser Asn Phe Thr
725 730 735

Ser Ile His Glu Gln Ser Glu His Gly Trp Trp Gly Ser Glu Asn Ile
740 745 750

Thr Ile Gln Glu Gly Asn Asp Val Phe Lys Glu Asn Tyr Val Thr Leu
755 760 765

Pro Gly Thr Phe Asn Glu Cys Tyr Pro Thr Tyr Leu Tyr Gln Lys Ile
770 775 780

Gly Glu Ser Glu Leu Lys Ala Tyr Thr Arg Tyr Gln Leu Arg Gly Tyr
785 790 795 800

Ile Glu Asp Ser Gln Asp Leu Glu Ile Tyr Leu Ile Arg Tyr Asn Ala
805 810 815

Lys His Glu Thr Leu Asp Val Pro Gly Thr Glu Ser Leu Trp Pro Leu
820 825 830

Ser Val Glu Ser Pro Ile Gly Arg Cys Gly Glu Pro Asn Arg Cys Ala

835

840

845

Pro His Phe Glu Trp Asn Pro Asp Leu Asp Cys Ser Cys Arg Asp Gly
850 855 860

Glu Lys Cys Ala His His Ser His His Phe Ser Leu Asp Ile Asp Val
865 870 875 880

Gly Cys Thr Asp Leu His Glu Asn Leu Gly Val Trp Val Val Phe Lys
885 890 895

Ile Lys Thr Gln Glu Gly His Ala Arg Leu Gly Asn Leu Glu Phe Ile
900 905 910

Glu Glu Lys Pro Leu Leu Gly Glu Ala Leu Ser Arg Val Lys Arg Ala
915 920 925

Glu Lys Lys Trp Arg Asp Lys Arg Glu Lys Leu Gln Leu Glu Thr Lys
930 935 940

Arg Val Tyr Thr Glu Ala Lys Glu Ala Val Asp Ala Leu Phe Val Asp
945 950 955 960

Ser Gln Tyr Asp Arg Leu Gln Ala Asp Thr Asn Ile Gly Met Ile His
965 970 975

Ala Ala Asp Lys Leu Val His Arg Ile Arg Glu Ala Tyr Leu Ser Glu
980 985 990

Leu Pro Val Ile Pro Gly Val Asn Ala Glu Ile Phe Glu Glu Leu Glu
995 1000 1005

Gly His Ile Ile Thr Ala Ile Ser Leu Tyr Asp Ala Arg Asn Val
1010 1015 1020

Val Lys Asn Gly Asp Phe Asn Asn Gly Leu Thr Cys Trp Asn Val
1025 1030 1035

Lys Gly His Val Asp Val Gln Gln Ser His His Arg Ser Asp Leu
1040 1045 1050

Val Ile Pro Glu Trp Glu Ala Glu Val Ser Gln Ala Val Arg Val
1055 1060 1065

Cys Pro Gly Cys Gly Tyr Ile Leu Arg Val Thr Ala Tyr Lys Glu

1070 1075 1080

Gly Tyr Gly Glu Gly Cys Val Thr Ile His Glu Ile Glu Asn Asn
1085 1090 1095

Thr Asp Glu Leu Lys Phe Lys Asn Arg Glu Glu Glu Glu Val Tyr
1100 1105 1110

Pro Thr Asp Thr Gly Thr Cys Asn Asp Tyr Thr Ala His Gln Gly
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Thr Ala Gly Cys Ala Asp Ala Cys Asn Ser Arg Asn Ala Gly Tyr
1130 1135 1140

Glu Asp Ala Tyr Glu Val Asp Thr Thr Ala Ser Val Asn Tyr Lys
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Pro Thr Tyr Glu Glu Glu Thr Tyr Thr Asp Val Arg Arg Asp Asn
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His Cys Glu Tyr Asp Arg Gly Tyr Val Asn Tyr Pro Pro Val Pro
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Ala Gly Tyr Val Thr Lys Glu Leu Glu Tyr Phe Pro Glu Thr Asp
1190 1195 1200

Thr Val Trp Ile Glu Ile Gly Glu Thr Glu Gly Lys Phe Ile Val
1205 1210 1215

Asp Ser Val Glu Leu Leu Leu Met Glu Glu
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